

REMARKS

In response to the non-final Office Action dated August 20, 2009, Applicants respectfully request reconsideration. Claims 1-19 were pending, of which claims 1, 4, 6-9, 13, and 16 are amended and claims 11-12, 14-15, and 19 are cancelled. Claims 20-23 are added. Thus, claims 1-10, 13, 16-18, and 20-23 are pending, with claims 1, 10, 13, and 22 being independent. No new matter has been added.

I. Allowable Subject Matter

Applicants thank the examiner for the indication that claim 10 has been allowed.

II. Claim Objections

Claim 17 is objected to as being dependent upon a rejected base claim, but is indicated as allowable if re-written in independent form to include all limitations of the base claim and intervening claims. Applicants thank the Examiner for the indication that claim 17 is allowable, but have left claim 17 in dependent form since claim 1, as amended, is believed to be allowable, and therefore claim 17 is also believed to be allowable based at least on its dependence.

III. Rejections Under 35 U.S.C. § 102

Claims 1, 3, 4, and 13 stand rejected under 35 U.S.C. § 102(a) as purportedly being anticipated by Azuma (JP 2002-289269). Claims 6 and 14 stand rejected under 35 U.S.C. § 102(e) as purportedly being anticipated by Nakamura (US 2002/0015881). Claims 7-9, 11, 12, 15, and 19 stand rejected under 35 U.S.C. § 102(b) as purportedly being anticipated by Nishimoto (US Patent No. 6,100,466). Applicants request reconsideration in view of the foregoing claim amendments and the following remarks.

A. Claim 1

Azuma fails to anticipate claim 1 because Azuma does not teach each and every limitation of the claim, as amended. Claim 1 now recites:

A method of manufacturing a photoelectric conversion device, comprising:
coating a transparent conductive substrate with a paste comprising a semiconductor fine grain and a binder made of a polymer compound;
sintering the paste at a temperature of between approximately 400 °C to 500 °C to form a semiconductor layer made of the semiconductor fine grain, the semiconductor layer comprising an organic substance; and
irradiating the semiconductor layer with ultraviolet rays for between approximately 4 and 70 hours to remove at least some of the organic substance in said semiconductor layer using a photocatalyst effect of the semiconductor fine grain (emphasis added).

Azuma fails to teach at least the above-highlighted limitation of claim 1. In fact, the Office recognizes that Azuma is silent about a time duration during which ultraviolet rays are applied, as can be seen in the treatment of previously pending claim 16 on page 6 of the Office Action, in which the Office states “Azuma does not disclose the period of time for which the ultraviolet rays are irradiated.” For at least this reason, the rejection of claim 1 under 35 U.S.C. § 102 cannot stand.

In addition, Applicants take this opportunity to note that claim 1, as amended, would also not have been obvious in view of Azuma. In rejecting previously pending claim 16, the Office concedes that Azuma is silent about the time period during which ultraviolet rays are applied, but asserts that it would have been obvious to one of ordinary skill in the art to use routine experimentation to determine an appropriate period of time (see page 6 of Office Action). However, there is no suggestion whatsoever in Azuma that a time duration such as that recited in claim 1 should be used. In fact, Azuma teaches away from using long irradiation times since he asserts that superfluous irradiation can actually lead to undesirable oxidation on the surface of the semiconductor electrode (see [0006] of Azuma). Thus, while Azuma does not explicitly teach what time period of irradiation should be used, he teaches away from using long time periods, and provides no suggestion to use the time recited in the above-highlighted limitation of claim 1.

For at least these reasons, Applicants request that the rejection of claim 1 be withdrawn. Applicants also request the withdrawal of the rejections of claims 2-9 and 16-18, since these depend from claim 1 and are patentable over the art of record for at least the same reasons.

Support for the amendments to claim 1 can be found in the application as filed, for example at least in FIG. 3 of the application and page 24, lines 9-16 of the specification.

B. Claim 13

Claim 13 is not anticipated by Azuma because Azuma fails to teach each and every limitation of the claim as amended. Claim 13 now recites:

A method of manufacturing a semiconductor layer,
comprising:
 forming a paste comprising a semiconductor fine grain and
 a binder made of a polymer compound;
 coating a substrate with the paste;
 sintering the paste between approximately 400 °C and 500
 °C, thereby forming the semiconductor layer comprising the
 semiconductor fine grain and an organic substance,
 *irradiating the semiconductor layer with ultraviolet rays
 for between approximately 4 and 70 hours* to remove, by using a
 photocatalyst effect of said semiconductor fine grain, at least some
 of the organic substance in said semiconductor layer. (emphasis
 added).

It should be appreciated from the foregoing discussion in section III(A) that Azuma fails to teach at least the above-highlighted limitation of claim 13. Accordingly, Applicants request that the rejection of claim 13 under 35 U.S.C. § 102 be withdrawn.

IV. Rejections Under 35 U.S.C. § 103

Various of the pending claims stand rejected under 35 U.S.C. § 103. However, each of these claims either depends from claim 1 and is allowable over the art of record for at least the same reasons as claim 1, or has been cancelled. Thus, the rejections under 35 U.S.C. § 103 are moot in view of the claim amendments made herein.

V. New Claims

New claims 20-21 have been added to further define Applicants' contribution to the art. Support for the claims can be found throughout the application as filed, such that no new matter has been added.

For example, support for claims 20-21 can be found at least at page 7, lines 1-6 of the specification. Claim 20 is patentable over the art of record because the art of record fails to teach or suggest a photoelectric conversion device made by the method of claim 8 and therefore having a semiconductor layer made of a semiconductor fine grain in which the content of a carbon component is equal to or less than 1 atomic %. Similarly, claim 21 is patentable over the art of record because the art of record fails to teach or suggest a photoelectric conversion device made by the method of claim 9 and therefore having a semiconductor layer made of a semiconductor fine grain in which the content of a carbon component is equal to or less than 0.3 atomic %.

Claim 22 is directed to a method of manufacturing a photoelectric conversion device. The method comprises coating a transparent conductive substrate with a paste comprising a semiconductor fine grain and a binder made of a polymer compound, sintering the paste at a temperature of between approximately 400 °C to 500 °C to form a semiconductor layer made of the semiconductor fine grain, and irradiating the semiconductor layer with ultraviolet rays in atmospheric conditions. Claim 22 is patentable over the art of record because the art of record fails to teach or suggest the combination of limitations recited in the claim. Support for the recited sintering temperatures can be found at least at page 26, line 19-23 of the specification. Support for the limitation of irradiating the semiconductor layer with ultraviolet rays can be found at least at page 26, line 25-page 27, line 2 of the specification. Although the specification does not explicitly state that the irradiation may be performed in atmospheric conditions, one of skill in the art would understand this to be the case.

Claim 23 depends from claim 22 and is patentable over the art of record for at least the same reasons as claim 22. Support for claim 23 can be found at least in FIG. 3 of the application and page 24, lines 9-16 of the specification.

CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, the Director is hereby authorized to charge any deficiency or credit any overpayment in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 23/2825, under Docket No. S1459.70081US00.

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Respectfully submitted,

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